

**CLAIMS**

We claim:

1. A composition suitable for an air barrier comprising an elastomer  
5 comprising C<sub>4</sub> to C<sub>7</sub> isoolefin derived units; and a plastomer, wherein the  
plastomer is a copolymer of ethylene derived units and C<sub>3</sub> to C<sub>10</sub>  $\alpha$ -olefin  
derived units, the plastomer having a density of less than 0.915 g/cm<sup>3</sup>;  
wherein naphthenic and aromatic oils are substantially absent from the  
composition.  
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2. The composition of Claim 1, wherein the plastomer comprises ethylene  
derived units and from 10 wt% to 30 wt% of C<sub>3</sub> to C<sub>10</sub>  $\alpha$ -olefin derived  
units.
- 15 3. The composition of Claim 1, wherein the plastomer comprises ethylene  
derived units and from 10 wt% to 30 wt% of units selected from 1-butene,  
1-hexene and 1-octene derived units.
4. The composition of Claim 1, wherein the plastomer comprises ethylene  
20 derived units and from 10 wt% to 30 wt% of octene derived units.
5. The composition of Claim 1, wherein the plastomer has a melt index of  
from 0.1 to 10 dg/min.
- 25 6. The composition of Claim 1, wherein the plastomer is present in the  
composition from 2 to 20 phr.
7. The composition of Claim 1, wherein the plastomer is present in the  
composition from 10 to 15 phr.  
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8. The composition of Claim 1, wherein the composition also comprises a  
processing oil.

9. The composition of Claim 8, wherein the processing oil is selected from paraffinic oils and polybutene processing oils, and mixtures thereof.
- 5 10. The composition of Claim 8, wherein the processing oil is present from 2 to 20 phr.
11. The composition of Claim 1, also comprising a filler selected from carbon black, modified carbon black, silicates, clay, exfoliated clay, and mixtures thereof.
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12. The composition of Claim 1, the composition also comprising a secondary rubber selected from natural rubbers, polyisoprene rubber, styrene-butadiene rubber (SBR), polybutadiene rubber, isoprene-butadiene rubber (IBR), styrene-isoprene-butadiene rubber (SIBR), ethylene-propylene rubber, ethylene-propylene-diene rubber (EPDM), polysulfide, nitrile rubber, propylene oxide polymers, poly(isobutylene-*co-p*-methylstyrene), halogenated poly(isobutylene-*co-p*-methylstyrene), poly(isobutylene-*co*-cyclopentadiene), halogenated poly(isobutylene-*co*-cyclopentadiene), and mixtures thereof.
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13. The composition of Claim 12, wherein the secondary rubber is present from 5 to 30 phr.
- 25 14. The composition of Claim 1, wherein the C<sub>4</sub> to C<sub>7</sub> isoolefin derived units are selected from isobutylene, isobutene, 2-methyl-1-butene, 3-methyl-1-butene, 2-methyl-2-butene, 1-butene, 2-butene, methyl vinyl ether, indene, vinyltrimethylsilane, hexene, and 4-methyl-1-pentene.
- 30 15. The composition of Claim 1, wherein the elastomer also comprises multiolefin derived units selected from isoprene, butadiene, 2,3-dimethyl-

1,3-butadiene, myrcene, 6,6-dimethyl-fulvene, hexadiene, cyclopentadiene, and piperylene.

- 5 16. The composition of Claim 1, wherein the elastomer also comprises styrenic derived units selected from styrene, chlorostyrene, methoxystyrene, indene and indene derivatives,  $\alpha$ -methylstyrene, *o*-methylstyrene, *m*-methylstyrene, and *p*-methylstyrene, and *p*-tert-butylstyrene.
- 10 17. The composition of Claim 1, wherein the elastomer is halogenated.
18. The composition of Claim 1, also comprising a curative selected from sulfur, sulfur-based compounds, metal oxides, metal oxide complexes, fatty acids, peroxides, diamines, and mixtures thereof.
- 15 19. The composition of Claim 1, wherein the composition has a brittleness value of less than  $-41.0^{\circ}\text{C}$ .
- 20 20. The composition of Claim 1, wherein the composition has a Shore A Hardness at  $25^{\circ}\text{C}$  is less than 55.
21. The composition of Claim 1, wherein the composition has an air permeability at  $65^{\circ}\text{C}$  is less than  $3.50 \times 10^{-8} \text{ cm}^3\text{-cm/cm}^2\text{-sec-atm}$ .
- 25 22. The composition of Claim 1, wherein the composition has an Adhesion to Carcass value is greater than 4 N/mm.
23. An article selected from tire curing bladders, innerliners, tire innertubes, and air sleeves made from the composition of Claim 1.
- 30 24. A composition suitable for an air barrier comprising polybutene processing oil; an elastomer comprising  $\text{C}_4$  to  $\text{C}_7$  isoolefin derived units; and a

plastomer, wherein the plastomer is a copolymer of ethylene derived units and C<sub>3</sub> to C<sub>10</sub>  $\alpha$ -olefin derived units, the plastomer having a density of less than 0.915 g/cm<sup>3</sup>.

- 5     25.     The composition of Claim 24, wherein the plastomer comprises ethylene  
derived units and from 10 wt% to 30 wt% of C<sub>3</sub> to C<sub>10</sub>  $\alpha$ -olefin derived  
units.
- 10     26.     The composition of Claim 24, wherein the plastomer comprises ethylene  
derived units and from 10 wt% to 30 wt% of units selected from 1-butene,  
1-hexene and 1-octene derived units.
- 15     27.     The composition of Claim 24, wherein the plastomer comprises ethylene  
derived units and from 10 wt% to 30 wt% of octene derived units.
- 20     28.     The composition of Claim 24, wherein the plastomer has a melt index of  
from 0.1 to 10 dg/min.
- 20     29.     The composition of Claim 24, wherein the plastomer is present in the  
composition from 2 to 20 phr.
- 25     30.     The composition of Claim 24, wherein the plastomer is present in the  
composition from 3 to 10 phr.
- 25     31.     The composition of Claim 24, wherein the polybutene processing oil has a  
number average molecular weight of from 900 to 8000.
- 30     32.     The composition of Claim 24, wherein the polybutene processing oil is  
present from 2 to 20 phr.

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33. The composition of Claim 24, also comprising a filler selected from carbon black, modified carbon black, silicates, clay, exfoliated clay, and mixtures thereof.
- 5 34. The composition of Claim 24, wherein paraffinic, naphthenic and aromatic oils are substantially absent from the composition.
- 10 35. The composition of Claim 24, the composition also comprising a secondary rubber selected from natural rubbers, polyisoprene rubber, styrene-butadiene rubber (SBR), polybutadiene rubber, isoprene-butadiene rubber (IBR), styrene-isoprene-butadiene rubber (SIBR), ethylene-propylene rubber, ethylene-propylene-diene rubber (EPDM), polysulfide, nitrile rubber, propylene oxide polymers, poly(isobutylene-*co-p*-methylstyrene), halogenated poly(isobutylene-*co-p*-methylstyrene),  
15 poly(isobutylene-*co*-cyclopentadiene), halogenated poly(isobutylene-*co*-cyclopentadiene), and mixtures thereof.
- 20 36. The composition of Claim 35, wherein the secondary rubber is present from 5 to 50 phr.
- 25 37. The composition of Claim 24, wherein the C<sub>4</sub> to C<sub>7</sub> isoolefin derived units are selected from isobutylene, isobutene, 2-methyl-1-butene, 3-methyl-1-butene, 2-methyl-2-butene, 1-butene, 2-butene, methyl vinyl ether, indene, vinyltrimethylsilane, hexene, and 4-methyl-1-pentene.
- 30 38. The composition of Claim 24, wherein the elastomer also comprises multiolefin derived units selected from isoprene, butadiene, 2,3-dimethyl-1,3-butadiene, myrcene, 6,6-dimethyl-fulvene, hexadiene, cyclopentadiene, and piperylene.
39. The composition of Claim 24, wherein the elastomer also comprises styrenic derived units selected from styrene, chlorostyrene,

methoxystyrene, indene and indene derivatives,  $\alpha$ -methylstyrene, *o*-methylstyrene, *m*-methylstyrene, and *p*-methylstyrene, and *p*-tert-butylstyrene.

- 5    40.    The composition of Claim 24, wherein the elastomer is halogenated.
41.    The composition of Claim 24, also comprising a curative selected from sulfur, sulfur-based compounds, metal oxides, metal oxide complexes, fatty acids, peroxides, diamines, and mixtures thereof.
- 10    42.    The composition of Claim 24, wherein the composition has a brittleness value of less than  $-41.0^{\circ}\text{C}$ .
43.    The composition of Claim 24, wherein the composition has a Shore A  
15    Hardness at  $25^{\circ}\text{C}$  is less than 50.
44.    The composition of Claim 24, wherein the composition has a aged Shore A Hardness at  $25^{\circ}\text{C}$  is less than 55.
- 20    45.    The composition of Claim 24, wherein the composition has an air permeability at  $65^{\circ}\text{C}$  is less than  $3.50 \times 10^{-8} \text{ cm}^3\text{-cm/cm}^2\text{-sec-atm}$ .
46.    The composition of Claim 24, wherein the composition has an Adhesion to Carcass value is greater than 4 N/mm.
- 25    47.    An article selected from tire curing bladders, innerliners, tire innertubes, and air sleeves made from the composition of Claim 24.
48.    A composition suitable for an air barrier comprising from 5 to 25 phr  
30    polybutene processing oil; halogenated star-branched butyl rubber; from 5 to 25 phr natural rubber; and from 5 to 25 phr of a plastomer, wherein the plastomer is a copolymer of ethylene derived units and  $\text{C}_3$  to  $\text{C}_{10}$   $\alpha$ -olefin

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derived units, the plastomer having a density of less than  $0.915 \text{ g/cm}^3$ ; the composition having a Brittleness value of less than  $-41.0^\circ\text{C}$ .

49. The composition of Claim 48, wherein the polybutene processing oil has a number average molecular weight of from 900 to 3000.
50. An article selected from tire curing bladders, innerliners, tire innertubes, and air sleeves made from the composition of Claim 48.